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# Public Subsidy on Education and Welfare in Small OECD Countries: A Theoretical and Empirical Reconciliation

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**ABSTRACT:** As per the conventional wisdom there should be provision for public assistance for skill acquirement for achieving higher economic growth in the future. However, empirical observations on small OECD countries over the period 2001-2011 tell somewhat a different story. This study makes an attempt in explaining those atypical findings, first theoretically by means of a simple dynamic two-sector, specific factor general equilibrium framework with endogenous skill formation and provision for public subsidy on education and then empirically with the help of conventional unbalanced panel data models. The analysis questions the desirability of the public subsidy policy on education in improving intertemporal social welfare in a small open developed economy.

**Keywords:** Skill formation, Education Subsidy, Intertemporal Social Welfare, General Equilibrium, Unbalanced Panel Data.

**JEL Classification:** D58, I24, I28, J31.

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# Public Subsidy on Education and Welfare in Small OECD Countries: A Theoretical and Empirical Reconciliation

## 1. Introduction and motivation

Workers in a society are differentiated with respect to their skills. The level of skills (say,  $z$ ) is a continuous variable and can take any value within the range  $[0,1]$ . Accordingly, in reality we find different groups of worker e.g. unskilled, low-skilled, semi-skilled, and skilled depending on the value of  $z$ . The higher the level of skills of a worker the greater would be his earning opportunities and hence wage. However, in different literatures e.g. the literature on skilled-unskilled wage inequality the distinction is simplified and only two extreme types of labor are considered, unskilled (with  $z \approx 0$ ) and skilled (with  $z \approx 1$ ).<sup>1</sup> Unskilled workers through acquisition of skills can become skilled labor over time and skill formation comes through education.<sup>2</sup>

The aspect of skill formation is extremely crucial in all countries irrespective of whether developed or developing.<sup>3</sup> It promotes human capital formation through positive

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<sup>1</sup> The literature on skilled-unskilled wage inequality includes the works of Harrison and Hanson (1999), Curie and Harrison (1997), Robbins (1995), Beyer et al. (1999), Feenstra and Hanson (1997), Wood (1997) etc.

<sup>2</sup> In this paper the two words, education and skill formation, have been used interchangeably. This means that we presume education automatically leads to higher skills, greater earning opportunities and higher wages. No distinction has been made between general education and vocational training.

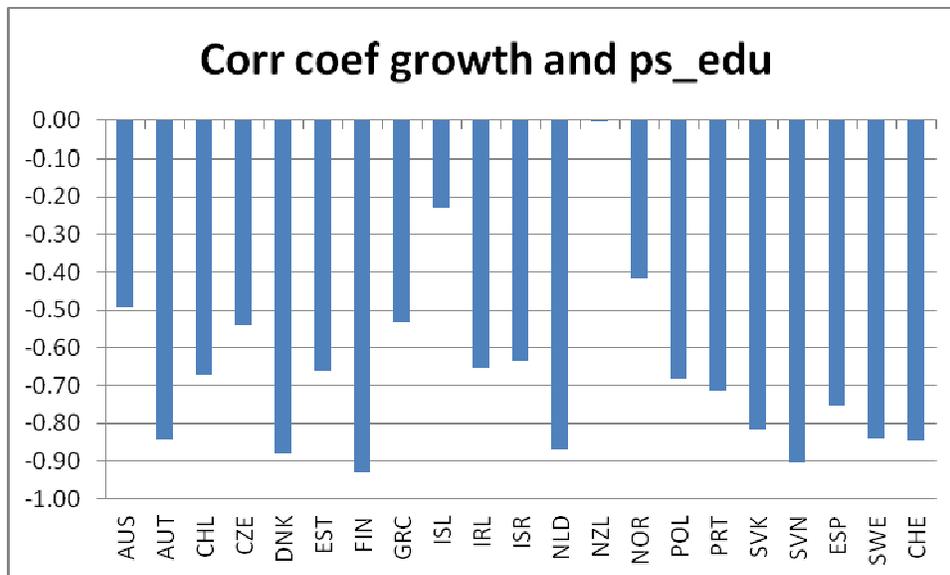
<sup>3</sup> Different facets of skill formation have been discussed in works like Autor (2014), Becker (1964), Brown et al. (2001), Crouch et al. (1999), Heckman and Krueger (2003), and Vanhuysse (2007).

externalities which is conducive to economic growth and prosperity of an economy. The literature on standard welfare economics suggests that education should be subsidized because it creates positive externalities. The acquisition of skills is a dynamic process. Unskilled workers going for skilled formation today would become skilled only tomorrow. Hence, given the size of the workforce, skill formation lowers the endowment of unskilled labor in the current period while that of skilled labor does not change in the current period. National income in the present period must fall as some resources (unskilled labor) go out of the production process. In the future unskilled workers going for skill acquisition in current period become skilled and therefore, the endowment of skilled labor goes up while that of unskilled labor does not change given the size of the workforce. Because of increased supply of skilled workers in future national income must increase. Hence, the economy clearly gains in future at the cost of present benefits. Therefore, the argument for subsidizing education is strengthened only if the subsidy improves the intertemporal social welfare. Here welfare is defined as the discounted sum of national income of the two periods.

In this context, it is extremely important to present some empirical observations on some small OECD countries over the recent periods. From our initial calculations carried out on available data for the period 2001-2011, we find that the simple correlation coefficients between GDP growth (annual %) and growth in aggregate public spending on education (% of GDP) are negative for small OECD economies e.g. Australia (AUS), Austria (AUT), Chile (CHL), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Greece (GRC), Finland (FIN), Iceland (ISL), Israel (IRL), Netherlands (NLD), Norway

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(NOR), Poland (POL), Portugal (PRT), Slovak Republic (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), and Switzerland (CHE).<sup>4</sup> These are reported in figure 1. It is noticed that all these correlation coefficients are negative although they vary widely between -0.002 and -0.932.



**Figure 1: The simple correlation coefficients between economic growth and growth in public spending on education as a percentage of GDP of some OECD countries**

These empirical observations lead to two pertinent questions which are as follows. (i) Do these atypical findings suggest that economic growth and public spending on education could be negatively related in small developed countries even after controlling all other relevant factors for economic growth as well as the great recessionary periods? (ii) If yes, could this negative relationship be theoretically explained?

<sup>4</sup> The relevant data have been taken out from the World Development Indicators of the World Bank (2014).

This paper purports to provide answers to the above questions both theoretically and empirically. In the first part of the paper, a simple two-period general equilibrium model with endogenous skill formation reasonable for a small open developed economy has been developed with an eye to examine the nature of the relationship between intertemporal social welfare (economic growth) and public expenditure on education. Like any other theoretical model this one is also based on certain simplifying assumptions. Quite naturally, the authenticity of the theoretical finding(s) comes into question. Keeping this possible criticism in mind the second part of our work is devoted to conduct a rigorous econometric analysis of the available data of 21 small OECD countries, taking all other prominent growth influencing factors as control variables. Our exhaustive consideration of control variables neutralizes the restrictiveness of the assumptions of the theoretical model and unravels the direct relationship between economic growth and public spending on education. Hence, this part apart from judging the appropriateness of the theoretical framework also provides an answer to the first question as mentioned above.

We have found an overall statistically significant negative relationship between economic growth and growth in public spending on education in the recent period, 2001-2011 which could be explained by means of our theoretical framework. These findings can at least question the desirability of providing public assistance for skill formation from the perspective of pure economic growth.

## **2. The Model**

## **4. The empirical analysis**

This section empirically examines the effect of a change in public spending on education (*ps\_edu*) on the economic growth (*growth*) for those 21 small open OECD countries as stated in the introduction section. Here countries are selected in accordance with our assumptions of the theoretical model.

## **5. Concluding remarks**

This paper has developed a dynamic two-sector, specific factor general equilibrium model with endogenous skill formation and education subsidy assisting skill acquisition with an eye to examine the theoretical plausibility of some recent empirical evidences on small OECD countries which suggest that public assistance for skill formation may not lead to higher economic growth over time. There are two types of labor, skilled and unskilled, where unskilled workers have the opportunity to go for skills acquisition, become skilled, and earn a higher wage in future. The aggregate supply of unskilled labor in the economy is determined from the intertemporal utility maximizing-behavior of the unskilled working families in the current period (period 1). The unskilled workers after acquiring skills join the army of skilled labor in future thereby increasing the endowment of skilled labor. Relative commodity prices and capital stock remain the same in both periods. Besides, the aggregate size of the workforce is also assumed to remain unchanged over time. A public subsidy designed to

promote skill formation lowers the supply of unskilled labor in both the periods but raises that of skilled labor in future. We have demonstrated that the policy lowers national income in the current period while it raises the same in the future. However, what happens to the discounted sum of national incomes is ambiguous. Therefore, the policy may fail to deliver the goods from the perspective of improving national welfare through assisting skill formation.

Our analysis may be criticized on the ground that some important issues like labor market imperfection especially those of unskilled labor, unemployment problem, efficiency wage considerations, and collective bargaining have not been captured. Furthermore, we do not take into account savings and direct costs associated with skill acquisition and its financing problem. Hence, the role of capital market imperfection has not been taken care of. The absence of any non-traded skill-intensive sector like services is also a limitation of the analysis. If some of these features are taken into consideration the results of the model may hold subject to one or two additional sufficient conditions. In defense, we can modestly argue that these are some of the salient features of the developing countries and that our structure is more appropriate for small developed countries rather than developing ones. Our subsequent empirical analysis on many small OECD countries also lends a helping hand to believe that the relationship between public expenditure on education and economic growth is indeed not that much unequivocal as it is believed to be. The present analysis deserves some attention because it questions the desirability of public subsidy on education from the standpoint of promotion of economic growth through human capital formation.

**References:**

Autor, D. H. (2014): 'Skills, education, and the rise of earnings inequality among the "other 99 percent"', *Science* 344(6186), 843-851.

Becker, G. S. (1964): *Human Capital*. Chicago: University of Chicago Press.

Beyer, H., Rojas, P. and Vergara, R. (1999): 'Trade liberalization and wage inequality', *Journal of Development Economics*, 59(1): 103-123.

Brown, P., Green, A., and Lauder, H. (2001): *High Skills: Globalization, Competitiveness, and Skill Formation*. Oxford: Oxford University Press.

Chaudhuri, S. and Mukhopadhyay, U. (2014): *FDI in Developing Countries: A Theoretical Evaluation*, Springer, IN.

Chaudhuri, S. and Mukhopadhyay, U. (2009): *Revisiting the Informal Sector: A General Equilibrium Approach*, Springer, New York, USA .

Crouch, C., Finegold, D., and Sako, M. (1999): *Are Skills the Answer: The Political Economy of Skill Creation in Advanced Industrial Countries*. Oxford: Oxford University Press.

Currie, J. and Harrison, A. (1997): 'Trade reform and labor market adjustment in Morocco', *Journal of Labour Economics*.

Feenstra, R.C. and Hanson, G.H. (1997): 'Foreign direct investment and relative wages: evidence from Mexico's maquiladoras', *Journal of International Economics*, 42: 371-394.

Harrison, A. and Hanson, G. (1999): 'Who gains from trade reform? Some remaining puzzles', *Journal of Development Economics*, 59(1): 125-154.

Heckman, J. and Krueger, A. (2003): *Inequality in America: What role for human capital policies?* MIT Press, Cambridge, MA.

Robbins, D. (1995): 'Trade, trade liberalization and inequality in Latin America and East Asia: Synthesis of seven country studies', HIID.

Vanhuyse, P. (2007): The new political economy of skill formation, *Public Administration Review* 67.

Wood, A. (1997): 'Openness and wage inequality in developing countries: the Latin American challenge to East Asian conventional wisdom', *World Bank Research Observer*, January.

World Bank, (2014). World Development Indicators. Washington, DC.